



Marine & Offshore

Certificate number: 53135/A0 BV

File number: .

Product code: 7333I

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

HY-LOK CORPORATION
BUSAN - KOREA (REPUBLIC OF)

for the type of product

BALL VALVES FOR LIQUEFIED GAS PIPING SYSTEMS

Cryogenic Ball Valves Class 150 / 300 / 600 & 900

Requirements:

Bureau Veritas Rules for the Classification of Steel Ships
Bureau Veritas Rules for the Classification of Offshore Units
IGC Code as amended by IMO Res. MSC.370(93)

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 17 Oct 2024

For Bureau Veritas Marine & Offshore,

At BV PUSAN, on 17 Oct 2019,
Chang-uk HONG



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

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BV Mod. Ad.E 530 June 2017

This certificate consists of 3 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

Cryogenic Ball Valves Class 150 / 300 / 600 & 900

1.1 Ratings

| | | |
|-------------------------|-----------------------------|-----------------------------|
| Size range | DN 15 to DN 300 | DN 15 to DN 50 |
| Design Standard | ASME B16.34: 2013 | ASME B16.34: 2013 |
| Class range | 150 | 300 / 600 & 900 |
| Design Pressure (bar) | 19 | 49.6 / 99.3 & 148.9 |
| Design Temperature (°C) | -196 | -196 |
| End connections | Flanged / Butt Welded / NPT | Flanged / Butt Welded / NPT |
| Design specification | Top entry | Top entry |

1.2 Materials

| Part | Material |
|--------|-----------------------|
| Body | ASTM A351 CF3M / CF8M |
| Bonnet | ASTM A351 CF3M / CF8M |
| Stem | SS316 |
| Seat | PCTFE & Graphite |
| Ball | SS316 |

When other choices of materials are used per manufacturer's recommendations, the BV agreement is to be obtained.

2. DOCUMENTS AND DRAWINGS

- Drawing N° 2017K15M01 Rev.0 dated 15/11/2017
- Drawing N° 2017K15M02 Rev.0 dated 15/11/2017
- Drawing N° 2017K15M03 Rev.0 dated 15/11/2017
- Drawing N° 2017K15M04 Rev.0 dated 15/11/2017
- Drawing N° 2017K15M05 Rev.0 dated 15/11/2017
- Design calculation sheet N° CRYOT-DR Rev.0 dated 20/11/2017

No departure from the above documents shall be made without the prior consent of the Society. The manufacturer must inform the Society of any modification or changes to these documents and drawings.

3. TEST REPORTS

3.1 Type tests witnessed by a BV Surveyor including hydrostatic test and seat leakage test at ambient temperature & valve operation and leakage test at the minimum design temperature:

- Test reports N° TR-TA-19G15-S01 dated 15/07/2019
- Test reports N° TR-TA-19G09-S02 dated 09 & 10/07/2019
- Test reports N° TR-TA-19G09-S03 dated 09 & 10/07/2019
- Test reports N° TR-TA-19C27-S01 dated 27 & 28/03/2019
- Test reports N° TR-TA-19C27-S02 dated 27 & 28/03/2019

3.2 Fire resistance test not performed.

4. APPLICATION / LIMITATION

4.1 May be used on cargo handling systems of ships granted with the notation liquefied gas carrier

4.2 The valves intended to be used for handling of Propylene Oxide or Ethylene Oxide/ Propylene Oxide mixtures shall be of a fire safe design.

4.3 The valve belongs to class I pressure piping according to the relevant requirements stated in Part D, Ch 9, Sec 5 of BUREAU VERITAS Rules.

4.4 The valve intended to be installed on BUREAU VERITAS classed ship have to comply with Pt D, Ch 9, Sec 5 & IGC Code and type tests reports witnessed by BUREAU VERITAS are to be available for each type and size of valve.

4.5 When required in Part D, Ch 9, Sec 6 of the Bureau Veritas Rules applicable to liquefied gas carriers, Charpy V-notch impact test shall be carried out for castings. Castings in steel grades 316 and 316L at any temperature will be impact tested at -196 °C. A reduction may be granted for design temperature above -60 °C after examination by the Society.

4.6 The materials for valves housing, disc and sealing should be of a suitable type at the temperature and pressure for use with cargoes intended to be carried.

4.7 The approval does not include any operating gear for remote control of the valves.

4.8 The valve is to be installed according to manufacturer's instructions and Society's Rule requirements.

5. PRODUCTION SURVEY REQUIREMENTS

5.1 The products are to be supplied by **HY-LOK CORPORATION** in compliance with the type and the requirements described in this certificate.

5.2 This type of product is within the category IBV of BV Rule Note NR320.

5.3 BV product certificate is required.

5.4 BV Certificates are required for materials of valve housings of Class I (DN \geq 50). Materials of valve housings of Class I (DN $<$ 50) and other pressure boundary parts of Class I are to be with work's certificates.

5.5 Materials are to comply with the approved drawings and the applicable requirements in Part D of the Society's Rules. Charpy impact test is to be as per the Society's Rules on materials, and where relevant, in accordance with requirements of IGC Code.

5.6 Each valve is to be tested according BV Rules Pt D, Ch 9, Sec 5 item 13.3.3.

For information, **HY-LOK CORPORATION** has declared to Bureau Veritas the following production site:

HY-LOK CORPORATION: #97, Noksansandan 27-ro, Gangseo-gu, BUSAN, KOREA (REPUBLIC OF)

6. MARKING OF PRODUCT

Each valve shall be permanently marked with at least:

- Manufacturer's name or logo
- Type designation
- Maximum working Pressure
- Society's brand as relevant

7. OTHERS

It is **HY-LOK CORPORATION's** responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

***** END OF CERTIFICATE *****